(12) UK Patent Application (19) GB (11) 2 021 952 A

(21) Application No 7922721
(22) Date of filing 29 Jun 1979
(23) Claims filed
(30) Priority data
(31) 12650/78
(32) 31 Mar 1978
(33) United Kingdom (GB)
(43) Application published
12 Dec 1979
(51) INT CL³
B27K 3/08 A01N 17/00
(52) Domestic classification
A5E 500 503 508 P
(56) Documents cited
None
(58) Field of search
A5E
D1P
(71) Applicants
Protim International Limited, Fieldhouse Lane, Marlow, Buckinghamshire, SL7 1LS
(72) Inventors
Colin Trevor Kyte, Laurence David Andrew Saunders, Christopher John Gill
(74) Agent
Laurence Shaw

(54) **Preservation of timber**

(57) A method of treating timber, comprises the steps of

(i) drawing an initial vacuum in the timber,

(ii) contacting the timber with a liquid preservative composition comprising a solution of a preservative in an organic solvent,

(iii) applying a positive pressure to the preservative composition in contact with the timber to urge the composition into the timber,

(iv) removing the preservative composition from contact with the timber,

(v) optionally applying a second vacuum to the timber to withdraw excess preservative composition from the timber, and

(vi) contacting the timber with a gas at a positive pressure to cause the preservative composition within the timber to penetrate further into the timber.

The gas is preferably compressed air.

ERRATUM

SPECIFICATION NO 2021952A

Front page, heading (52) Domestic classification *after* P *start new line insert* D1P 1103 1105 WK

THE PATENT OFFICE
6 February 1980

Bas 73705/9

GB 2 021 952 A

(12) UK Patent Application (19) GB (11) 2 021 952 A

(21) Application No 7922721
(22) Date of filing 29 Jun 1979
(23) Claims filed
(30) Priority data
(31) 12650/78
(32) 31 Mar 1978
(33) United Kingdom (GB)
(43) Application published
12 Dec 1979
(51) INT CL²
B27K 3/08 A01N 17/00
(52) Domestic classification
A5E 500 503 508 P
(58) Documents cited
None
(58) Field of search
A5E
D1P
(71) Applicants
Protim International Limited, Fieldhouse Lane, Marlow, Buckinghamshire, SL7 1LS
(72) Inventors
Colin Trevor Kyte, Laurence David Andrew Saunders, Christopher John Gill
(74) Agent
Laurence Shaw

(54) Preservation of timber

(57) A method of treating timber, comprises the steps of

(i) drawing an initial vacuum in the timber,

(ii) contacting the timber with a liquid preservative composition comprising a solution of a preservative in an organic solvent,

(iii) applying a positive pressure to the preservative composition in contact with the timber to urge the composition into the timber,

(iv) removing the preservative composition from contact with the timber,

(v) optionally applying a second vacuum to the timber to withdraw excess preservative composition from the timber, and

(vi) contacting the timber with a gas at a positive pressure to cause the preservative composition within the timber to penetrate further into the timber.

The gas is preferably compressed air.

GB 2 021 952 A

SPECIFICATION

Preservation of timber

This invention concerns preservation of timber, particularly by impregnating the timber with a preservative composition comprising a solution of a wood preservative in an organic solvent.

It is known to impregnate timber with a solution of a wood preservative in an organic solvent. The preservative may be one or more of a fungicide, an insecticide, a fire retardant or a water-repellent substance. The organic solvent may be, for example, white spirit, fuel oil or methylene chloride. The impregnation of timber with such a preservative composition may be carried out by either the so-called "double vacuum" process or the so-called "double vacuum/pressure" process. In these processes, the timber is loaded into a treatment vessel, and is subjected to an initial vacuum to extract air from the cells of the timber. The preservative composition is then admitted to the treatment vessel where the composition enters the timber cells either solely as a result of the vacuum within the cells (as in the double-vacuum process) or with the assistance of a positive pressure applied to the preservative composition (as in the double-vacuum/pressure process). The treatment vessel is then drained of preservative composition and a further vacuum is applied to remove excess composition from the timber. The double vacuum process is commonly used for the treatment of species of timber such as European redwood (*Pinus sylvestris*), which are relatively permeable to the preservative composition, and the double vacuum/pressure process for less permeable species such as spruce or whitewood (*Picea abies*). Both processes are defined in the British Wood Preservers' Association Specifications 112 to 117 inclusive. An apparatus for carrying out the process in a particularly effective way is described and claimed in British Patent Specification 1,405,754.

A difficulty which often arises in the treatment of timber is that the timber emerging from the treatment apparatus is dripping wet with preservative composition and, in running off the timber, this liquid can be a hazard to operatives and can contaminate soil.

It is an object of this invention to provide a method of impregnating relatively less permeable species of timber such as spruce or whitewood, with a preservative composition, which not only reduces the uptake of composition to achieve a given distribution of preservative within the timber, but also reduces hazards to operatives and risk of soil contamination.

According to the invention, a method of treating timber is provided, comprising the steps of

(i) drawing an initial vacuum in the timber,

(ii) contacting the timber with a liquid preservative composition comprising a solution of a preservative in an organic solvent,

(iii) applying a positive pressure to the preservative composition in contact with the timber to urge the composition into the timber,

(iv) removing the preservative composition from contact with the timber,

(v) optionally applying a second vacuum to the timber to withdraw excess preservative composition from the timber, and

(vi) contacting the timber with a gas at a positive pressure to cause the preservative composition within the timber to penetrate further into the timber.

In this context, a positive pressure is a pressure which is above ambient atmospheric pressure, and a vacuum is a pressure which is below ambient atmospheric pressure. Both are terms of the art of timber treatment.

It has been found that by contacting the timber with a gas at a positive pressure in the method of the invention, an improved penetration of preservative into the timber is obtained, even with species of timber which are relatively impermeable to liquid preservative compositions. In addition, less preservative composition is required to achieve penetration of the composition to a given depth. A further advantage of the method is that the newly treated timber is almost dry on the surface, which is important from an environmental point of view since possible contamination of soil and skin contact of personnel with potentially hazardous chemicals is reduced.

The gas used may be, for example, argon, neon, nitrogen or a mixture of these. A much preferred gas is compressed air as air is safe to use and sources of compressed air are readily available.

The preservative composition may be any of those available for use in the double vacuum and double vacuum/pressure processes.

Preferably the initial vacuum is drawn to a value of between −0.1 and −1 bar and is maintained for between 5 and 50 minutes, the pressure applied to the preservative composition in contact with the timber is between 0.5 and 5 bar and is maintained for between 3 and 150 minutes, and the pressure of the gas is between 0.5 and 20 bar and is maintained for between 10 and 300 minutes.

Most preferably the initial vacuum is drawn to a value of between −0.7 and −0.9 bar and is maintained for between 10 and 20 minutes, the pressure applied to the liquid in contact with the timber is between 1 and 2 bar and is maintained for between 5 and 15 minutes, and the pressure of the gas is between 1 and 3 bar and is maintained for between 40 and 70 minutes. By carefully controlling these parameters within the above limits it is possible to reduce the uptake of preservative composition by

44% or more, for a given depth of penetration of the composition, compared with known methods.

The optional second vacuum may be drawn to a value of between −0.1 and −1 bar for between 2 and 20 minutes.

The complete treatment is preferably adjusted to take less than 3 hours, and most preferably less than 90 minutes, to perform. An improved uniformity and depth of penetration may be obtained by keeping the treatment within these preferred time limites. It has been found that the less permeable species of timber may still retain a significant proportion of the initial vacuum within the timber up to three hours after the initial vacuum is drawn, due to the relatively slow penetration of the preservative into such timber. In such a case, the residual vacuum increases the pressure difference within the timber during the application of the gas under positive pressure.

The invention also includes timber which has been treated by the method.

The invention is illustrated by the following Examples:

EXAMPLE 1.

Matched samples of European whitewood (*Picea abies*) each 200 x 50 x 50 mm with their end-grains sealed with an epoxy resin were divided into two groups designated A and B, each group consisting of 75 samples.

Group A samples were loaded into a timber treatment vessel which was then sealed. A vacuum of −0.83 bar was drawn in the vessel and maintained for 10 minutes. Preservative composition comprising a solution of a fungicide in petroleum distillate, was passed into the vessel whilst the vacuum was maintained until the vessel was full, whereupon a positive pressure of 1.0 bar was applied for 10 minutes. The vessel was then vented to atmosphere whilst the preservative composition was drained off, and the vessel was then resealed. Using compressed air, a positive pressure of 1.0 bar was then applied and maintained for 50 minutes. The vessel was then vented to atmosphere, unsealed, and the timber samples were removed.

The Group B samples were loaded into the same timber treatment vessel which was then sealed. An initial vacuum of −0.83 bar was applied for 10 minutes. The same preservative composition was passed into the vessel whilst the vacuum was maintained until the vessel was full, whereupon a positive pressure of 1.0 bar was applied for 60 minutes. The vessel was then vented to atmosphere, drained of preservative composition, resealed, and then a further vacuum of −0.83 bar was applied for 20 minutes following which the vessel was adjusted to atmosphere, unsealed and the timber samples were removed.

The results obtained when the samples were examined are shown in Tables I and II.

TABLE I.

	Group A	Group B
Overall preservative uptake	37.6 l/m³	66.7 l/m³
Percentage surface area penetrated to at least 2.5 mm deep	90.6%	90.7%
Percentage surface area penetrated to at least 4.0 mm deep	79.5%	82.1%

TABLE II

Depth below lateral surface (mm)	Loading of Preservative (Kg/m³)	
	Group A	Group B
0 to 1	224	266
1 to 2	138	142
2 to 4	89	113
4 to 6	65	99
6 to 8	46	82
8 to 10	33	69

The results of Table I show that by applying a positive pneumatic pressure to preservative liquid within a less permeable species of timber as the final stage of the treatment process, it was possible to cause the preservative to penetrate into the timber to the same extent as the same process but without the final step, while at the same time using less preservative composition.

Table II shows in more detail the distribution of the preservative within the two samples.

The Group A samples were surface-dry immediately after removal from the treatment vessel, whereas there was an appreciable volume of liquid dripping off the Group B samples.

EXAMPLE 2.

The procedure of Example 1 was repeated, but this time the treated samples of both groups were blotted on each side for 2 seconds on clean pieces of absorbent tissue paper. The total weight increase of the blotting tissues was measured. The weight of preservative composition dripping from the timber immediately following treatment was also measured, allowance being made for the preservative composition which dripped from the bogie which carried the samples in and out of the treatment vessel. From these figures, the total volume of preservative composition present on the surface of the samples immediately after treatment was calculated.

The results obtained are shown in Table III:

TABLE III.

	Group A	Group B
Volume of preservative composition present on surface of samples.	18.85 ml	50.6 ml

The results show a significant reduction in surface wetness of the samples treated by the method of the invention, Group A, compared with the samples treated by a conventional technique, Group B.

CLAIMS

1. A method of treating timber, comprising the steps of

(i) drawing an initial vacuum in the timber,

(ii) contacting the timber with a liquid preservative composition comprising a solution of a preservative in an organic solvent,

(iii) applying a positive pressure to the preservative composition in contact with the timber to urge the composition into the timber,

(iv) removing the preservative composition from contact with the timber,

(v) optionally applying a second vacuum to the timber to withdraw excess preservative composition from the timber, and

(vi) contacting the timber with a gas at a positive pressure to cause the preservative composition within the timber to penetrate further into the timber.

2. A method according to Claim 1, in which the gas is compressed air.

3. A method according to Claim 1 or 2, in which the initial vacuum is drawn to a value of between −0.1 and −1 bar and is maintained for between 5 and 50 minutes, the pressure applied to the preservatives composition in contact with the timber is between 0.5 and 5 bar and is maintained for between 3 and 150 minutes, and the pressure of the gas is between 0.5 and 20 bar and is maintained for between 10 and 300 minutes.

4. A method according to Claim 3, in which the initial vacuum is drawn to a value of between −0.7 and −0.9 bar and is maintained for between 10 and 20 minutes, the pressure applied to the liquid in contact with the timber is between 1 and 2 bar and is maintained for between 5 and 15 minutes, and the pressure of the gas is between 1 and 3 bar and is maintained for between 40 and 70 minutes.

5. A method according to any preceding claim, in which the treatment takes less than 3 hours to perform.

6. A method according to Claim 5, in which the treatment takes less than 90 minutes to perform.

7. A method according to Claim 1, which is substantially as described herein.

8. A method according to Claim 7, which is substantially as described in the Examples.

9. Timber which has been treated by a method according to any preceding claim.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1979. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.